

# Researchers investigate nut allergy mechanisms

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ARS researchers and their university partners have validated the ability of a database of allergenic proteins to predict when a person who is allergic to one kind of nut may also be allergic to proteins in another kind of nut, a condition called "cross-reactivity." Credit: Microsoft Clip Art.

U.S. Department of Agriculture (USDA) scientists teamed with university collaborators to validate the ability of a database of allergenic proteins to predict when an individual will react to two or more different types of nuts, a condition called "cross-reactivity."

Soheila Maleki, a chemist with the Agricultural Research Service (ARS) Food Processing and Sensory Quality Research Unit in New Orleans, La., worked with Catherine Schein and colleagues at the University of Texas Medical Branch in Galveston, who developed the Structural Database of Allergenic Proteins (SDAP). ARS is USDA's chief

intramural scientific research agency.

Foods, including peanuts and tree nuts, contain proteins that are digested into smaller fragments called peptides. A peptide is called an epitope when it is recognized by antibodies, which are immune system components in the bloodstream. Immunoglobulin E (IgE) is an antibody that is present in higher levels in allergic individuals. When IgE binds to the epitopes, the food is recognized as foreign by the immune system, and an allergic reaction occurs.

The proteins between cross-reactive nuts are thought to have similar IgE antibody-recognition sites. The researchers took known IgE binding sites (epitope sequences) from peanut and nut proteins and ran those through the SDAP database in order to predict cross-reactive epitopes in other nuts.

The computer-generated binding sequences were then made into synthetic epitopes to conduct tests using serum from people who are allergic to peanut and tree [nuts](#), because their serum's IgE recognizes allergenic epitopes. The serum allowed the team to match previously unknown epitopes, within the major allergenic proteins, that are known to be common to a variety of nut and peanut allergies.

The finding indicates that SDAP can be useful for predicting previously unidentified cross-reactive epitopes, based on their similarity to known IgE epitopes. The study, funded in part by the U.S. Environmental Protection Agency and the National Institutes of Health, was published in *Allergy* in 2011.

**More information:** Read [more](#) about this research in the October 2013 issue of *Agricultural Research* magazine.

Provided by Agricultural Research Service

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